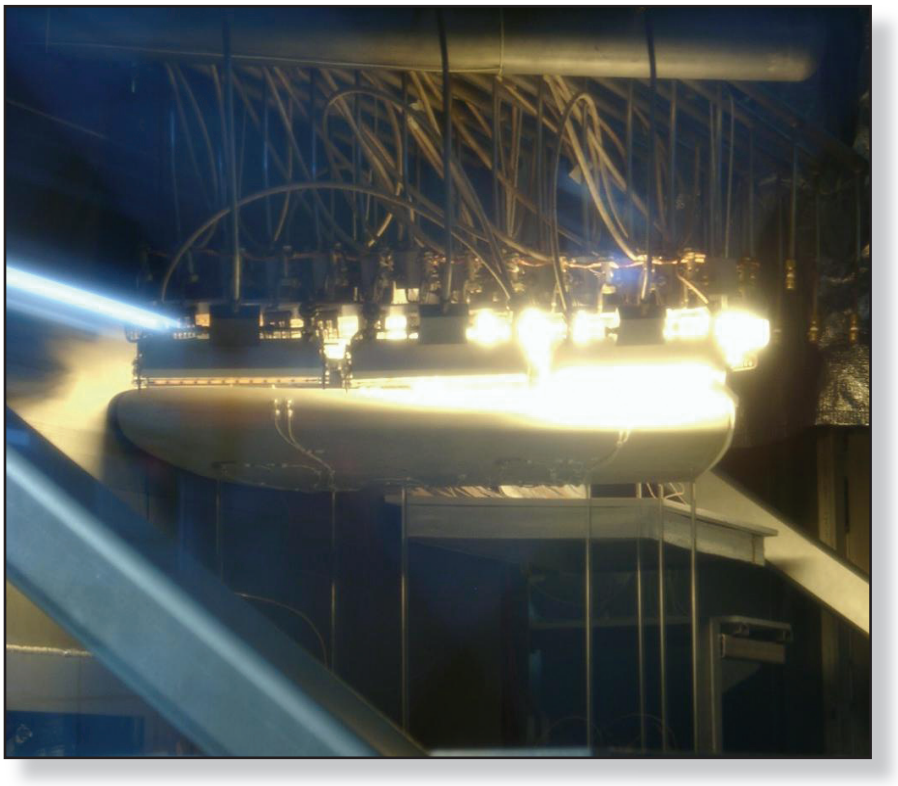
Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

AFRL SUPPORTS NASA X-37 PROGRAM



AFRL provided state-of-the-art support to the National Aeronautics and Space Administration (NASA) using its unique, in-house experimental validation capabilities. This partnership enables development of future reusable launch vehicle technology.

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Accomplishment

AFRL completed vital experimental validations on a carbon-carbon ruddervator control surface subcomponent that may one day be used on the X-37 reusable launch vehicle. During a series of thermal and static load tests, the ruddervator subcomponent successfully withstood temperatures up to 2300˚F and static loads 2 times higher than those of operational conditions. NASA used these test results to verify the ruddervator's analytical model. Subjecting the ruddervator to such extreme conditions was an important part of verifying that it could resist exposure to the conditions experienced during orbit reentry.

Background

These tests supported NASA's current evaluation of possible control surface designs for its X-37 orbital vehicle concept. These control surfaces include ruddervators, which control pitch and yaw, and flaperons, which control roll and augment lift. The tests' nature and volume prompted NASA to seek AFRL's help in sharing the work. Boeing provided NASA the test article, which was designed by Science Applications International Corporation and manufactured by Carbon-Carbon Advanced Technologies.

AFRL's Aerospace Structures Research Facility is the largest combined-environment experimental facility in the world. It provides state-of-the-art validation capabilities to all government agencies and to industry and academia through cooperative research and development agreements. In addition to the thermal and mechanical load validation capabilities it provided for these experiments, the facility can simultaneously expose structures to mechanical loads, acoustic noise, vibration, and heat to simulate conditions experienced by air and space vehicles during flight. Scientists use this resource to solve various air vehicle structural problems and ultimately increase aircraft performance.

Air Vehicles
Emerging Technologies

Additional Information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (05-VA-08)